INVERSION AS A PURELY STRUCTURAL PHENOMENON*

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1. Introduction

In English, SAI (Subject auxiliary inversion) has the effect of switching the order of the subject and the first auxiliary, e.g. in wh-questions, yes/no-questions, conditionals, and with negative preposing:

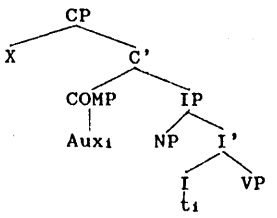
(1) When did Mary quit smoking?
(2) Did Mary quit smoking while she was expecting?
(3) Had Mary quit smoking while she was expecting, her child would have been healthier.
(4) Never has Mary even tried to quit smoking.

While it is general consensus that the landing site for the inverted verb in the above examples is Comp (as first proposed in Koster 1975 and den Besten 1978), there is no agreement with respect to what constitutes the trigger for inversion. In this paper I will defend the idea of Travis (1984), criticized in Weerman 1989, that movement to a pre-S position (e.g. wh-movement) requires the head of S', Comp, to be filled. In order to unify all instances of inversion, not just those that involve movement to a pre-Comp position, Travis suggests that questions and conditionals involve question and conditional operators in their Comp position. Recasting the terms into the new X'-system of Chomsky (1986a) makes it possible to propose a rather simple generalization:

(5) Inversion is triggered in a clause whenever its Spec of Comp is filled.

Below is the representation for inversion-triggering clauses:

(6)



(X stands for any non-null element: a wh-word or an empty operator).

However, this attractive solution has a serious flaw, justly criticized by Weerman (1989). Namely, the operators seem to be generated in an ad hoc way, without independent support. The sole motivation for a Q (question) operator is to ensure interrogative interpretation. However, sentences without Q (judging by the fact that inversion is not triggered in them) can have interrogative reading, given the right intonation:

(7) Mary invited John?

This seriously undermines the need for a Q operator (see Weerman 1989 and references cited there). The contribution of this paper will be to provide independent motivation for the postulation of an operator in questions and conditionals. Moreover, I will assume that one and the same operator appears in questions and conditionals, call it Polarity Operator (Op), and that it is responsible for negative polarity licensing. Only when it is present in the Spec of Comp (judging by the fact that inversion is triggered) can a negative polarity item be licensed:

(8) Op Did Mary invite anyone?
(9) *Mary invited anyone?

Further syntactic evidence for the operator will be offered in section 3. Once the need for polarity operator is independently motivated, Weerman's criticism no longer holds. Furthermore, the postulation of polarity operator will make it possible to suggest answers to the following intriguing questions:

1. Why is it that fronting of certain negative adverbials (corresponding to *why* and *how*) does not trigger inversion?
2. Why is it that these same wh-words do not give rise to rhetorical interpretations in wh-questions containing negative polarity items?

The paper will be organized in the following way. Section 2 will summarize the already established reasons for taking Head of Comp as the landing site, based on the crosslinguistic facts that inversion is incompatible with filled Head of Comp. New supporting evidence from Serbo-Croatian yes/no questions will be offered. Section 3 will argue that the trigger for

Inversion is a filled Spec of Comp. For wh-questions and negative preposing, the Spec of Comp is filled by movement, whereas in yes/no questions and conditionals there is an empty polarity operator in the Spec of Comp whose existence will be independently motivated. Section 4 will discuss the problem of rhetorical wh-questions and non-unitary character of negative preposing. The discussion will concentrate on English, although an occasional excursus to other languages will suggest that the phenomenon is crosslinguistic.

2. Head of Comp as the landing site

The general incompatibility of overt complementizers with inversion has led to the proposal by Koster (1975) and den Besten (1978) that Comp is the landing site for the inverted verb (see also Koopman 1983). Translated into the new X'-framework of Chomsky (1986a), the landing site for inverted verb will be Head of Comp, the position of complementizers. Notice that this movement observes the general Structure Preserving Principle (Chomsky 1986a) which requires heads to move only to other head positions. In this case, movement proceeds from the head position of Infl to the head position of Comp.

Given the general assumption that *if* resides in the head of Comp, one can straightforwardly explain why *if*-clauses do not exhibit inversion, although bare conditionals do (see example 3):

(10) *If had Mary quit smoking while she was expecting, her child would have been healthier.

The landing site for SAI is already taken. One may object, however, that if-less clauses in English are rather restricted. However, in German where complementizer (*wenn* 'if') deletion in conditionals is more productive, the same pattern emerges:

(11) Will man Erfolg haben, dann muss man arbeiten.
will one success have then must one work
'If one wants to be successful, one must work.'
(12) *Wenn will man Erfolg haben, dann muss man arbeiten.

Evidence from other constructions is also available. Serbo-Croatian has two types of yes/no questions: 'bare' questions and questions introduced by the complementizer *da* 'that'. As illustrated below,

inversion is triggered only in bare questions, and not in *da*-questions:[1]

(13) Dolazi li Marija?[2]
comes Q Mary
'Is Mary coming?'
(14) *Marija li dolazi?
(15) Da li Marija dolazi?
that Q Mary comes
'Is Mary coming?'
(16) *Da dolazi li Marija?

That overt complementizers block Inversion has also been established for Italian (Rizzi 1984), Norwegian (Taraldsen 1986), and Swedish (Platzak 1986).

3. Filled Spec of Comp

As illustrated above, a filled Comp will block inversion. A more challanging task, however, is to find the common denominator of all the inversion-triggering environments. What is it that wh-questions, antecedents of conditionals, yes/no questions, and negative preposing have in common? How do they differ from declaratives, which do not trigger inversion?

3.1. Wh-questions

The most obvious case seems that of wh-questions. Wh-words are generally held to reside in the Spec of Comp (see Chomsky 1986a). So, let us hypothesize that this is the distinguishing factor, i.e., that Inversion is triggered when Spec of Comp is filled. (Independent factors will block Inversion if Comp is filled, as pointed out in the previous section.)

One possible problem for this analysis is wh-words in situ. On the assumption that they raise to the Spec of Comp at LF, one may wonder why they do not trigger inversion:

(17) Mary saw what.

However, since inversion is an S-structure (visible) rule, it can only be affected by the Spec of Comp filled at S-structure.

Related to this is the question of subject extraction. As has long been noticed, subject wh-extraction in English does not trigger inversion:

(18) Who knows the answer?
(19) *Who does know the answer?

One obvious difference between subject movement and other instances of wh-movement is that the former, if there is movement at all, involves vacuous (i.e. unobservable) movement. As Chomsky (1986a) points out, vacuous movement need not take place before LF. In that case, the subject wh-word will remain in its situ position at S-structure, and Inversion (an S-structure rule) will not apply.

Yet another potential problem concerns the absence of inversion in embedded questions, at least in Standard English:

(20) Mary asked why Peter should go.
(21) *Mary asked why should Peter go.

To account for this I adopt Koopman's (1983) proposal that all finite embedded clauses have an underlying complementizer in C position.[3] Inversion is therefore blocked since the landing site for the auxiliary is already occupied.

So, it seems safe to assume that inversion applies whenever there is a wh-word in the Spec of Comp. We can then generalize this observation and propose that all the inversion triggering environments have thier Spec of Comp filled.[4] It remains to establish that negative adverbs in negative preposing appear in the Spec of Comp, and that yes/no questions and conditionals involve a null operator in their Spec of Comp.

3.2. Negative Preposing

To establish that negative preposing moves the negative adverb to the Spec of Comp, consider the following contrast:

(22) Why has Mary never tried to quit smoking?
(23) *Why never has Mary tried to quit smoking?

The incompatibility of preposed negative adverbs with wh-words (noticed in Emonds 1976) clearly indicates that they compete for the same position.

A similar argument comes from epistemic modals. According to McDowell (1987), epistemic modals raise to Comp at LF in order to take scope over the whole proposition. She shows that epistemic modals are for

this reason incompatible with wh-operators, for example:

(24) ?*Who must have killed Yuri?

Like wh-operators, preposed negative adverbs are also incompatible with epistemic modals:

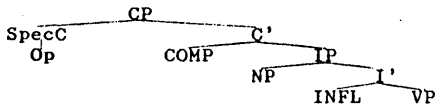
(25) John must never have loved Mary.
(26) *Never must John have loved Mary.

Having established that both wh-movement and negative preposing have as their landing site Spec of Comp, it remains to show that the Spec of Comp is filled in other inversion-triggering environments as well.

3.3. Yes/no questions and conditionals

In Progovac 1988 (see also 1990) I argued that there is a null operator in the Spec of Comp of non-negative polarity contexts, such as, yes/no questions, conditionals, and complements of adversative predicates in order to provide locality conditions on polarity sensitivity.[5] The following is the general structure of non-negative polarity environments:

(27)



Yes/no Questions
(28) [CP Op [C' Has [IP anyone resigned?]]]

Conditionals
(29) [CP Op [C' had [IP anyone resigned]]], we would have known.

Adversative Predicates:
(30) I doubt [CP Op [C' that [IP anyone has resigned]]]

Comparatives[6]:
(31) John is taller than [CP Op [IP anyone in his class is]].

Too-constructions:
(32) John is too short [CP Op [IP to reach anything on the shelf]].

As suggested by Rizzi (1990), the Spec of Comp is reserved for affective operators such as wh-phrases and negation, while other operators IP-adjoin. His conjecture is that the canonical scope position for affective operators at LF is an A'-Specifier position.

That licensing of negative polarity has to proceed via an operator in the Spec of Comp (in the absence of overt negation) is strikingly confirmed by the following contrast:

(33) Mary forgot CP[Op C'[that IP[anyone had insulted her on Monday.]]]
(34) *Mary forgot anything.

The adversative predicate *forget* licenses NPIs only in its complement, but not in the matrix, even though it c-commands the matrix object NP. This shows that adversative predicates cannot license NPIs directly, but only via an operator in the Spec of Comp.

Given the proposed generalization, repeated below for ease of reference, inversion in conditionals and yes/no questions is accounted for: it is triggered by the polarity operator.

(35) Inversion is triggered in a clause whenever its Spec of Comp is filled.

Inversion is blocked in comparatives and with adversative predicates for exactly the same reason it is blocked with embedded wh-questions: because of an underlying Complementizer (see section 3.1). Being confined to finite clauses (see footnote 3), however, this explanation does not extend to *too*-constructions. But, since *too*-constructions involve no auxiliaries, inversion cannot apply.

To avoid a stipulative character of the proposed polarity operator, some independent evidence is offered for its existence, based upon its similarities with a wh-operator. First of all, like a wh-operator, it is incompatible with epistemic modals which are argued in McDowell (1987) to raise to Comp at LF (see section 3.2):[7]

(36) ?*Why must John have left?
(37) ?*Must John have left?
(38) ?*If John must have left, I'll go too.
(39) ?*Mary doubts that John must have left.

(The question of the (in)compatibility of wh-operators with polarity operators will be addressed below.)

Second, the existence of a polarity operator in the Spec of Comp seems essential in order to explain locality requirements on polarity sensitivity. To see this, let us summarize the proposal in Progovac 1988. Negative Polarity Items (NPIs) are analyzed as A'-anaphors which have to be bound by an appropriate A'-binder in their governing category. This accounts for two facts. First of all, it explains why NPIs always need a licenser, as illustrated by the following contrast:

(40) John did not see any people on the lake.
(41) *John saw any people on the lake.

Second, it explains why the relation between the NPI and its licenser has to be local in some languages, e.g. Serbo-Croatian, where only clausemate negation licenses a type of NPI:

(42) Marija ne razume ništa.
Mary not understands nothing
'Mary does not understand anything.'
(43) *Goran ne tvrdi [da Marija razume
Goran not claims that Mary understands
ništa].
nothing
'Goran does not claim that Mary understands anything.'
(44) *Da li Marija razume ništa?
Does Mary understand nothing
'Does Mary understand anything?'

I argued there that the dependencies between the NPI and its licenser are local even in English. In the examples of long-distance licensing (as in (45) below) the NPI raises at LF[8] through the Spec of Comp to become clausemates with the licensing negation:

(45) John did not claim that Mary understands anything.

Independent arguments for LF raising offered in Progovac 1988 involve the ECP, Specificity, and Topicalization.

In addition to being licensed by negation, NPIs can also be licensed by the polarity operator, as illustrated for English in the examples (28) to (32) above. However, in Serbo-Croatian, these environments

cannot host local NPIs, i.e. the type illustrated in (42), but only the type that occurs with superordinate negation:

(46) Goran ne tvrdi [da Marija razume išta].
Goran not claims that Mary understands anything
'Goran does not claim that Mary understands anything.'
(47) Da li Marija razume išta?
Does Mary understand anything
'Does Mary understand anything?'

This suggests that licensing by Op patterns with licensing by superordinate negation, rather than by clausemate negation.

The same conclusion follows from the behavior of PPIs (Positive polarity items). PPIs, e.g. *some*, obligatorily take wide scope only with respect to clausemate negation, but are free to take either wide or narrow scope with respect to superordinate negation or polarity operator:

(48) %Mary did not sell some books.
(49) John did not say that Mary sold some books.
(50) Did John sell some books at the conference?
(51) If Mary had sold some books, she would have had money on her.
(52) I doubt that Mary has sold some books.
(The symbol % indicates that the sentence is acceptable only on the wide scope reading of the PPI *some*.)

In Progovac 1988, PPIs are argued to be A'-pronominals, thus having to be free from clausemate negation. In order to accommodate these facts it is proposed that Op falls outside of the governing category for NPIs and PPIs in their base-generated positions. To achieve this, without forcing the wh-operator to fall outside of the domain in which it binds its trace (see Generalized Binding Framework of Aoun 1985, 1986), one needs to say that the first potential antecedent creates the opaque domain (as has been suggested for other anaphors by, e.g. Chomsky (1986b), Aoun and Li (1989), and Rizzi (1990):

(53) The governing category for X is the first maximal projection Y which contains X and its first potential antecedent.

For *wh*-trace, the first potential antecedent will be *a wh*-element in the Spec of Comp. Therefore, its

governing category will be the minimal maximal projection containing the potential antecedent and the anaphor, i.e. CP. For NPIs, the first potential antecedent will be negation in Infl. Therefore the governing category for NPIs will be the minimal maximal projection containing negation and the NPI, i.e. IP. Notice that the actual presence of negation (or a wh-word) in the sentence is not required in order to create the opaque domain.

Under this analysis one can capture the fact that NPIs and PPIs are not always in complementary distribution in a principled way. As a pronominal, a PPI has to be free only from potential binders in its governing category, i.e. from clausemate negation. But nothing prevents it from being bound, that is, from taking narrow scope with respect to distant triggers. Notice that in Ladusaw's (1980) framework one has to stipulate that PPIs are antitriggered only by clausemate negation, and not by the whole set of downward entailing expressions which trigger NPIs.[9] If locality requirements are recognized which rest on the anaphor/pronominal distinction, it can be maintained that all the NPI triggers are also PPI anti-triggers. If both NPIs and PPIs are allowed in certain contexts, it is because the trigger is outside of the governing category for PPIs, and because NPIs are allowed to raise at LF, thus extending their governing category (see footnote 8):

(54) Does Mary respect anyone/someone?
(55) If Mary respects anyone/someone, I'll be happy.

The following section will discuss potential problems raised by the proposed analysis.

4. (In)compatibility of wh-words with polarity operator

Our proposal that Op appears in the Spec of Comp seems to predict that no polarity items will ever appear in wh-questions. This is because the polarity licenser (Op) competes with wh-words for the Spec of Comp position. However, this prediction is not borne out since the following questions are grammatical:

(56) Who has Mary ever insulted t?
(57) Where did Mary ever go without her husband?

But notice that both of the above counterexamples have one thing in common: strong expectation that the wh-operator is ranging over an empty set of individuals, so that (56) and (57) are nearly paraphrasable as:

(58) No one is such that Mary has ever insulted him.
(59) Nowhere did Mary ever go without her husband.

Any account of these phenomena will have to address the question of where this negation comes from. In Progovac (1988) I proposed to account for this extraordinary fact by assuming that polarity Op is in effect negative (which I argued for on other grounds), and that in the above example it merges with the wh-word in the Spec of Comp to produce a negated NPI. That a merged negative polarity item is possible in the Spec of Comp is evident from negative preposing (see section 3.2):

(60) Never (neg + ever) has Mary invited John to lunch.

It is also true crosslinguistically that wh-words can serve as NPIs, e.g. in Chinese and Serbo-Croatian:

(61) Ni xiang chi sheme ma?
you like eat what Q
'Would you like to eat anything?'
(62) Da li je Milan i-šta doneo?
that Q has Milan any-what brought
'Has Milan brought anything?'

However, even to the extent to which this explanation is plausible, it raises further questions. As noticed by Borkin (1971) and Lawler (1971), the occurrences of NPIs in *why* and *how* questions do not give rise to rhetorical interpretions. These look like genuine questions (examples from Borkin):

(63) Why did anybody go home so soon?
(64) How did anybody break open the safe?

Unlike questions in (56) and (57), they presuppose that the action has taken place so that Lawler calls *why* and *how* 'factives'. But notice that the same presupposition facts will obtain if we analyze these wh-words as negated NPIs:

(65) Somebody left home for no (obvious) reason.
(66) Somebody broke open the safe in no (obvious) way.

This reduces to a more general phenomenon: the fact that negated factives do not change the truth value of the proposition.

Of course, the proposal given here cannot readily explain why the overt negated NPIs of the above kind do

not trigger inversion when appearing sentence initially, as noted in Lakoff 1970 and Lawler 1971:

(67) For no reason, Mary left home.
(68) *For no reason did Mary leave home.

Examples like these would pose a counterexample for the analysis of inversion proposed in this paper if negated NPIs were in the Spec of Comp. The fact that these negated NPIs do not license anaphoric NPIs suggests that they do not c-command the sentence, i.e., that they cannot be in the Spec of Comp:

(69) *For no reason, Mary left any pets at home.

Notice that negated NPIs relating to time, which trigger inversion, do license NPIs in the clause:

(70) At no time did John beat any children.

It remains to explain why negated NPIs related to reason or way or instrument cannot appear in the Spec of Comp. Maybe Lawler has an answer: exactly because they are factives which preserve the truth value of the proposition. On the general assumption that Comp and Infl are related,[10] negation in Comp would force negation into Infl as well, resulting in the cancelling of the proposition. But this is not allowed with factives.

5. Conclusion

In conclusion, if it is correct that Inversion is triggered in a clause whenever its Spec of Comp is filled and its Comp empty, it remains to explain how this follows from more explanatory principles. The generalization actually amounts to claiming that if the head position (of Comp) is empty, its spec position has to be empty too, suggesting that it may be related to the general phenomenon of Spec-Head agreement (cf. Chomsky 1986a). In other words, the minimal requirement seems to be that non-null material in Head has to agree with non-null material in Spec. Suppose that agreement holds freely between two null elements. If true, this conclusion would not commit one to the view (held by Travis (1984)) that matrix sentences are IPs, rather than CPs, unless Comp is filled.

NOTES

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[1]It is important to note that Serbo-Croatian, as a 'free' word order language, allows inverted word order even in declarative statements:
(i) Marija dolazi.
Mary comes
(ii) Dolazi Marija.
The difference between declaratives, on the one hand, and bare yes/no questions and conditionals, on the other, is that inverted word order is optional with the former, but obligatory with the latter. I will therefore assume that Inversion applies only with the latter, while declaratives involve scrambling, which is structurally a different process.

[2]It is hard to tell what the role of the particle *li* in questions is. I have marked it Q, implying that it is a question particle, but this is not quite correct given that *li* is also found in conditionals:
(i) Dodje li Marija, ićićemo u bioskop.
comes Q Mary go-will-1pl in cinema
'If Mary comes, we'll go to see a movie.'
It may be that it cliticizes to Comp, this explaining why it attaches to either complementizer *da* or to the moved verb.

[3]We have to restrict this generalization to finite clauses in order to avoid the problem of PRO being governed by this underlying complementizer.

[4]This generalization still leaves unexplained a difference between some of these SAI environments. While it is possible to drag along the negative clitic in yes/no questions, it does not seem possible to do so in some other instances of SAI:
(i) Didn't Mary quit smoking?
(ii) *Hadn't Mary quit smoking while she was expecting, her child would have developed asthma.
(iii) ??When didn't Mary quit smoking.

[5]Notice that it is necessary to assume that this operator quantifies over truth values, rather than syntactic variables, in order to avoid vacuous quantification and Bijection principle violations in

general (see Koopman and Sportiche 1982). For some speculations on its semantics, see Progovac 1988.

[6]The reason why *than* does not appear in the head of Comp in this structure is because the examples like the following from non-standard English (see Radford 1988) and Serbo-Croatian show that it precedes the Spec of Comp position:
(i) John is taller than [what Peter is].
(ii) Milan je viši nego [S' što je Petar].
Milan is taller than what is Peter.

[7]Some speakers do not find these examples as bad as indicated. As observed by McDowell (1987), these sentences are good on (irrelevant) echo readings, i.e., as repetitions of previous utterances. It may be that such readings are available to those speakers.

[8]That quantifiers raise at LF is a widely held assumption. Many assume that NPIs raise at LF, e.g. May (1977), Linebarger (1981), Larson and Ladusaw (1986), Lasnik and Uriagereka (1988). Notice that anaphors have also been argued to raise at LF (see Pica 1987, Cole, Hermon and Sung 1990, and references cited there).

[9]Ladusaw argues that NPIs are licensed in downward entailing (DE) environments, for example, negative clauses:
(i) John did not eat a vegetable.
(ii) John did not eat a carrot.
(i) is downward entailing because it allows inferences from supersets (vegetable) to subsets (carrot). In contrast, a positive environment would not be DE because it does not allow for such inferences:
(iii) John ate a vegetable.
(iv) John ate a carrot.

[10]That there is agreement between Comp and Infl is evident even in English where the choice of finite Infl requires *that* complementizer, whereas the choice of infinitival Infl (*to*) requires *for* complementizer (Radford 1988). This agreement relation is overtly marked in other languages, e.g. Irish and West Flemish. As pointed out in Haegeman (1983), both the tensed Infl and Comp are marked for agreement in person and number with the subject of the clause. In Irish, on the other hand, both Infl and Comp are marked for tense (see McCloskey 1979). Rizzi (1982) argues that in Italian Infl (former Aux) actually moves to Comp. Also, for some languages exhibiting Verb-Second, it has been

proposed that Infl is actually in Comp (see Haider 1986).

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